

Does sleep damage the child's developing brain?

Hypoxia, fragmentation and other unknowns



Sarah Biggs
Child and Adolescent Respiratory and Sleep Health Centre

Paediatric sleep disorders

- Sleep Breathing disorders
- Disorders of initiating and maintaining sleep
- Insomnia
- Parasomnias
- Sleep-related movement disorders



What happens when sleep is disturbed?



Sleep Disordered Breathing



Continuum of sleep-related Upper Airway Obstruction (Sleep Disordered Breathing)

Primary Snoring

Upper Airway Resistance Syndrome

Obstructive Sleep Apnoea / Hypoventilation Syndrome

UAO Spectrum

Increased respiratory effort

Hypoxia
Hypercapnia
Apnoea
Hypopnea

Minimal arousal

Maximal/
Complete arousal

Neurocognition

Impaired Attention

Anecdotal Evidence

(Guillemainault 1976, Stradling 1990)

Standardised Testing

(Owens-Stively 1997, Blunden 2000, Lewin 2002 – dose effect, O'Brien 2004, Gottlieb 2004)

Treatment helps

(Ali 1996, Owens, 2000)

Memory

Impaired

(Rhodes 1995 – dose effect, Blunden 2000, Gottlieb 2004, Kaemingh 2003)

Not Impaired

(O'Brien 2004)

Learning

Impaired

(Guillemainault 1981, 1982, 1996, Stradling 1990, Gozal 1998, Gozal & Pope 2001, Kaemingh 2003, Urschitz, 2005)

Executive Function

Impaired

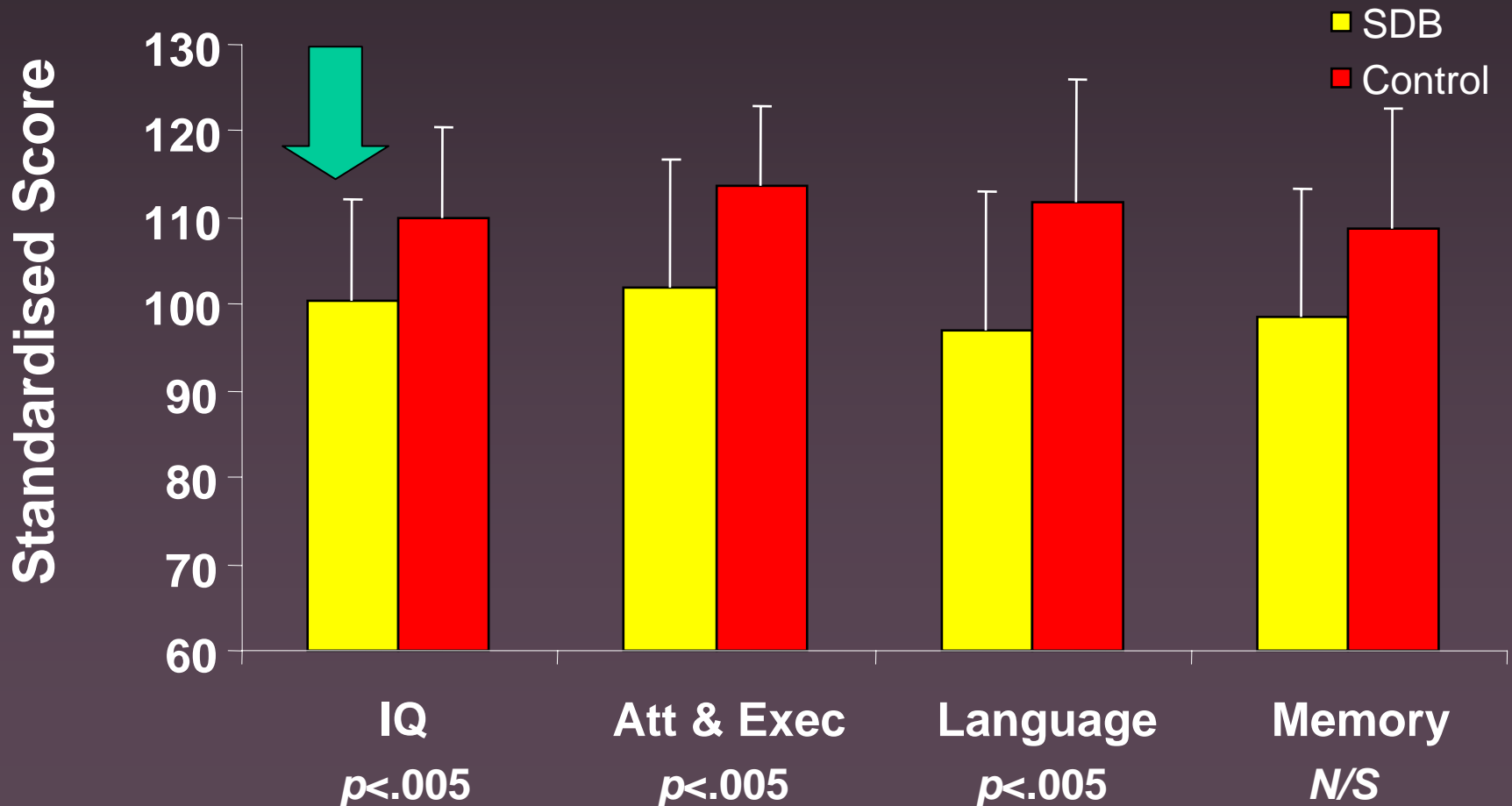
(Owens 2000, O'Brien 2004)

Baseline Neurocognitive Performance

53 SDB
(6.8 ± 2.8y, 62% male)

vs

51 non-snoring controls
(7.5 ± 2.6y, 47% male)



Comparison of children with SDB versus children with Disorders of Initiating and Maintaining Sleep (DIMS)



Significant group differences

	Snorers+ DIMS (n=8)	Snorers (n=11)	DIMS (n=14)	Controls (n=31)
Global IQ	86.6 (8.3)	91.7 (10.6)	95.9 (9.1)	99.7 (11.3)
Selective Attention #	25.5 (12.1)	23.5 (11.1)	13.4 (7.6)	11.7 (11.4)
Impuls- ivity#	9.9 (4.4)	9.6 (4.6)	6.3 (3.8)	4.1 (3.7)

High scores = reduced attention

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Unknowns

- Eczema comorbid with
 - DIMS
 - Arousals/nightmares
 - Sleep/wake transitions
- Reflux comorbid with
 - Central apnoeas



**Are the damages
irreversible?**

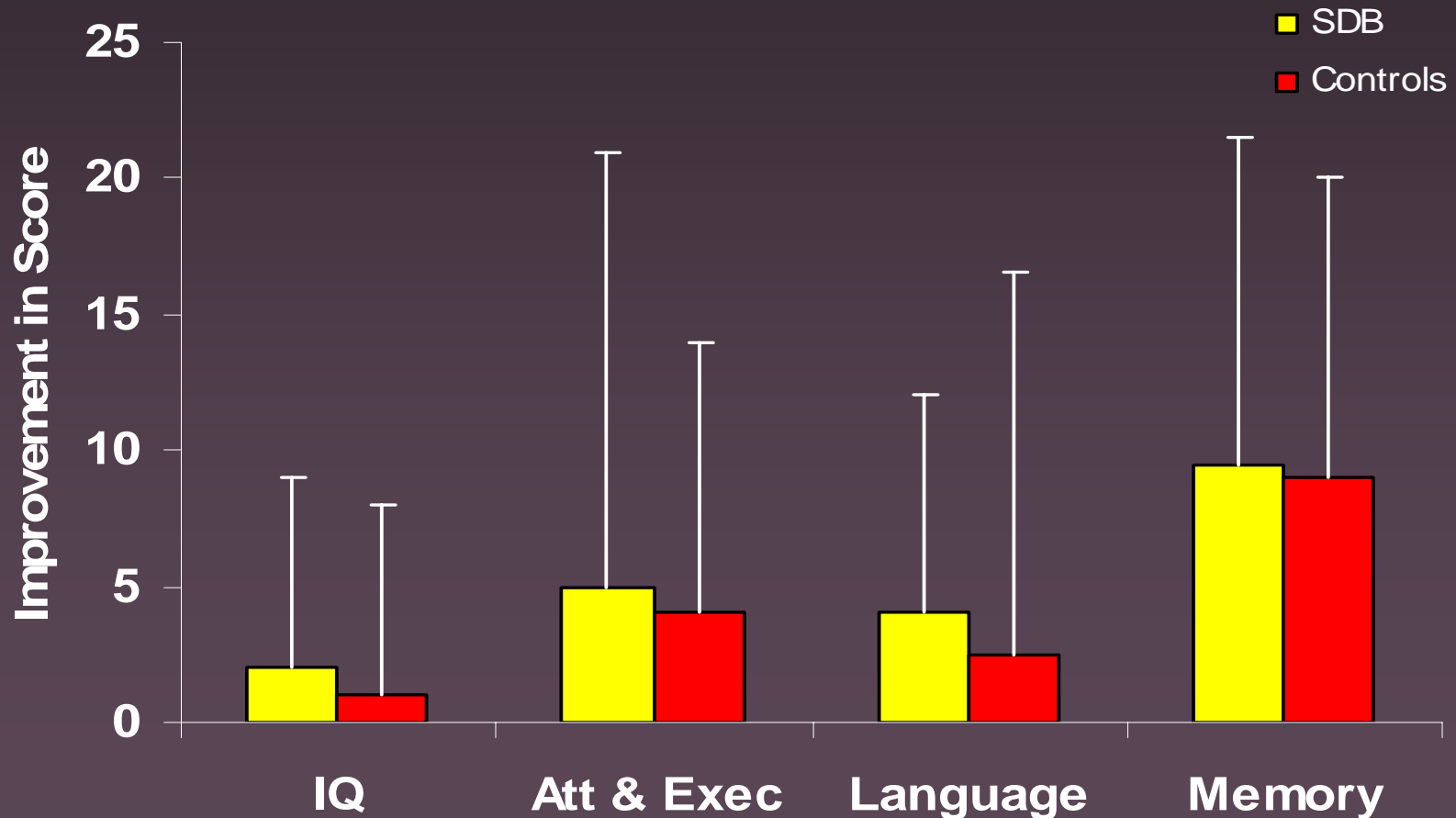


Post-Treatment Neurocognitive Performance

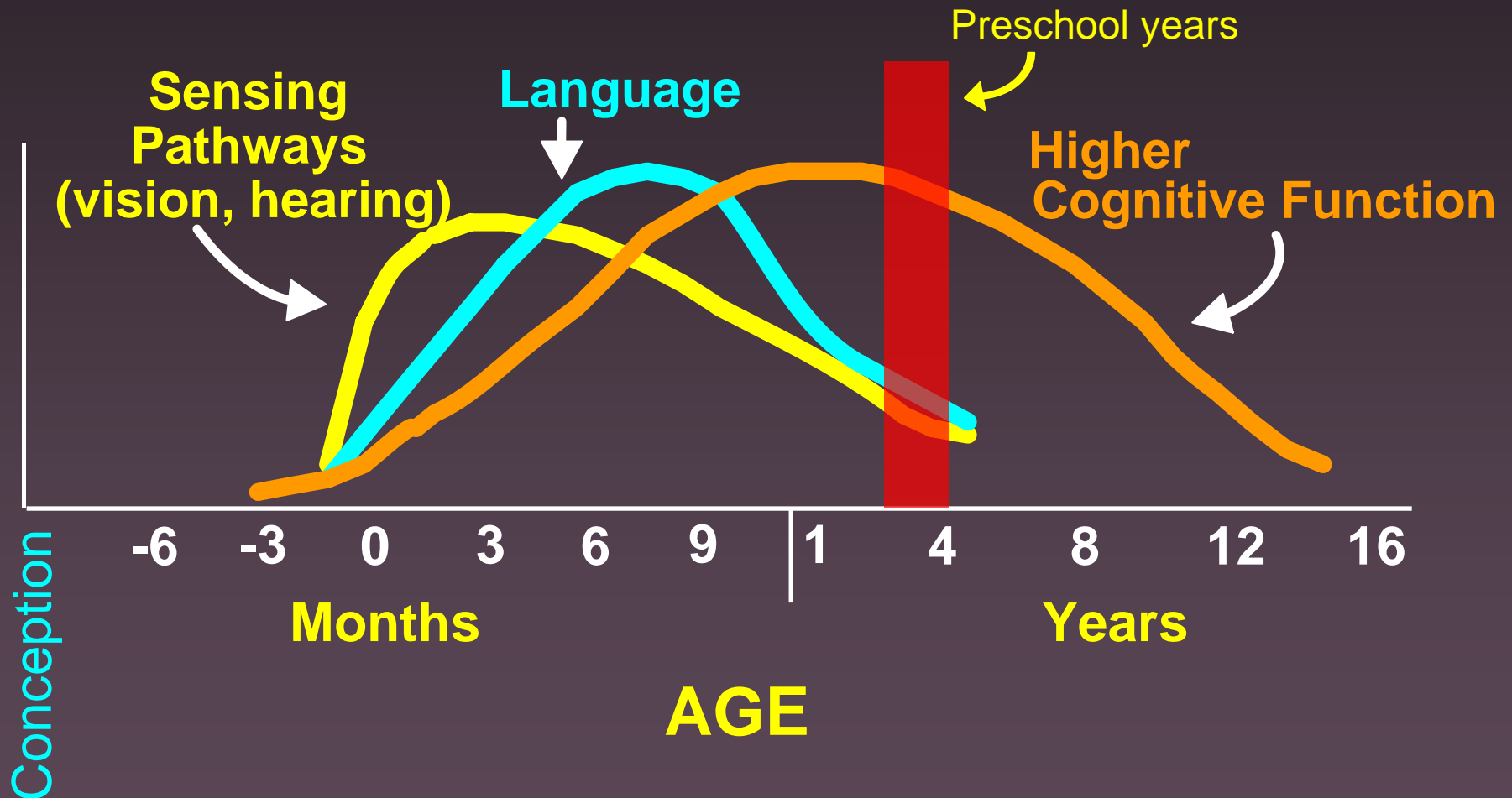
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Human Brain Development – Language and Cognition



Where to from here?



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